



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,037	01/15/2004	Stan W. Livingston	PD-03W006	8483

7590 12/29/2005

Leonard A. Alkov, Esq.
Raytheon Company
P.O. Box 902 (E4/N119)
El Segundo, CA 90245-0902

EXAMINER

VU, JIMMY T

ART UNIT	PAPER NUMBER
2821	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/760,037	Applicant(s) LIVINGSTON ET AL.	
	Examiner Jimmy T. Vu	Art Unit 2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,13-22,26-28 and 32-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-21,35-37,39 and 40 is/are allowed.
- 6) ☒ Claim(s) 1,4-8,22,26-28,32-34,38 and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/15/04, 7/29/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1, 4-8, 22, 26-28, 32-34, 38 and 41 have been considered but are moot in view of the new ground(s) of rejection.

Despite applicant's disagreement, the examiner decides to provide new rejection as below. Other references have been incorporated to strengthen the examiner's position with respect to the antenna array device.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-8, 22, 26-28, 32-34, 38 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Engblom (U.S. Patent number 6,002,367).

Regarding claim 1, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a ground plane structure (1);

a feed structure (6) comprising a set of probe feeds disposed at spaced locations behind the ground plane structure: and

an electrically conductive back plane structure (2) arranged behind the probe feeds such that the probe feeds are between the ground plane structure and the back plane structure, the back plane structure providing RF shielding (Figs. 1 and 8A-8D, col. 2, lines 40-67, col. 3, lines 1-67).

Regarding claim 4, Engblom discloses the array wherein the feed structure comprises a balanced push-pull feed coupled to each of the probe feeds and comprising a pair of feed lines driven in anti-phase (Figs. 1 and 8A).

Regarding claim 5, Engblom discloses the array further comprising an impedance transformer for coupling a low impedance transmission structure to a higher load impedance of the continuous slots (Figs. 1 and 8A).

Regarding claims 6 and 26, Engblom discloses the array wherein the impedance transformer comprises a stripline impedance transformer circuit positioned behind the back plane Structure (Figs. 1 and 8A).

Regarding claims 7 and 27, Engblom discloses the array wherein the stripline impedance transformer circuit transforms an impedance of 50 ohms into the load impedance of the continuous slot (Figs. 1 and 8A, col. 2, lines 40-65).

Regarding claims 8 and 28, Engblom discloses the array wherein said ground plane structure is a planar structure (Figs. 1 and 8A-8D).

Regarding claim 22, Engblom discloses an antenna array, comprising:
an array of continuous slots (5) formed in a conductor plane structure (1);
a balanced push-pull feed structure (6) for exciting the array of continuous slots, the balanced push-pull feed structure comprising a periodic set of probe feeds disposed behind the ground plane structure;

a back plane structure (2) comprising a conductive layer disposed behind the set of probe feeds and spaced a distance S1 from the conductor plane structure, such that the set of probe feeds is sandwiched between the conductor plane structure and the back plane structure; and

an impedance transformer (17) for coupling a low impedance transmission structure to a higher load impedance of the continuous slots (Figs. 1 and 8A-8D, col. 2, lines 40-67, col. 3, lines 1-67).

Regarding claim 32, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a ground plane structure (1);

a feed structure (6) comprising a set of probe feeds disposed at spaced locations behind the ground plane structure, wherein the probes are spaced apart by a spacing no greater than one half wavelength at the highest operating frequency (Figs. 1 and 8A-8D, col. 2, lines 40-67, col. 3, lines 1-67).

Regarding claim 33, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a ground plane structure (1); and

a feed structure (6) comprising a set of probe feeds disposed at spaced locations behind the ground plane structure;

wherein the probe feeds each comprise a pair of feed wires each connected to a feed wire portion which is positioned in a general parallel orientation relative to the ground plane structure (Figs. 1 and 8A-8D, col. 2, lines 40-67, col. 3, lines 1-67).

Regarding claim 34, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a ground plane structure (1);

a feed structure (6) comprising a set of probe feeds disposed at spaced locations behind the ground plane structure; and

spaced short posts inside and underneath each slot along slot edges (Figs. 1, 8A-8D and 9A-9F, col. 2, lines 40-67, col. 3, lines 1-67).

Regarding claim 38, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a conductor plane structure (1);

a balanced push-pull feed structure (6) for exciting the array of continuous slots, the balanced push-pull feed structure comprising a periodic set of probe feeds disposed behind the ground plane structure; and

a back plane structure (2) comprising a conductive layer disposed behind the set of probe feeds and spaced a distance S1 from the conductor plane structure, such that the set of probe feeds is sandwiched between the conductor plane structure and the back plane structure;

wherein the balanced push-pull feed is coupled to each of the probe feeds and comprising a pair of feed lines driven in anti-phase for each probe feed (Figs. 1, 8A-8D and 9A-9F, col. 2, lines 40-67, col. 3, lines 1-67, col. 4, lines 40-50).

Regarding claim 41, Engblom discloses an antenna array, comprising:

an array of continuous slots (5) formed in a conductor plane structure (1); a balanced push-pull feed structure (6) for exciting the array of continuous slots, the balanced push-pull feed structure comprising a periodic set of probe feeds disposed behind the ground plane structure;

a back plane structure (2) comprising a conductive layer disposed behind the set of probe feeds and spaced a distance S1 from the conductor plane structure, such that the set of probe feeds is sandwiched between the conductor plane structure and the back plane structure;

wherein said probe feeds are spaced apart by a spacing no greater than one half wavelength at the highest operating frequency (Figs. 1 and 8A-8D, col. 2, lines 40-67, col. 3, lines 1-67).

Allowable Subject Matter

3. Claims 13-21, 35-37 and 39-40 are allowed.

None of the prior art teaches the dual polarization antenna array comprising the second array of continuous slots formed in the ground plane structure, the second array orthogonal to the first array to define the checker-board pattern of conductive pads in the ground plane structure.

Information Disclosure Statement

4. The references listed on the information disclosure statement submitted on 01/15/2004 and 07/29/2005 have been considered.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy T Vu whose telephone number is (571) 272-1832. The examiner can normally be reached on M - F: 9 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300.

Art Unit: 2821

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2800.

Primary Examiner

A handwritten signature in black ink, appearing to read 'Jimmy Vu', with a long horizontal flourish extending to the right.

Jimmy Vu

December 20, 2005